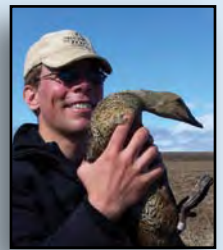


Tracking Movements of King Eiders in the Bering Sea



Steffen Oppel is hoping to graduate this December with a PhD from the University of Alaska where he is working under Dr. Abby Powell. Steffen's interest in conservation led to this project on King Eider populations which had declined, and about which little was known about their ecology. Steffen will be working with Abby for another half year as a post-doc until he hopefully finds an interesting job in the field of ecology/conservation biology somewhere in the world.

The Bering Sea is a wild place, and not many bird watchers venture out into this stormy place. The distribution and movements of birds in the Bering Sea is therefore poorly understood, especially during winter when ice covers most of the northern Bering Sea. Despite the harsh conditions, it is used by many birds during winter as the very rich marine fauna offers sufficient food for large numbers of birds. But where exactly sea birds occur, and from which breeding areas they migrate into the Bering Sea, was largely unknown until the advent of satellite telemetry.

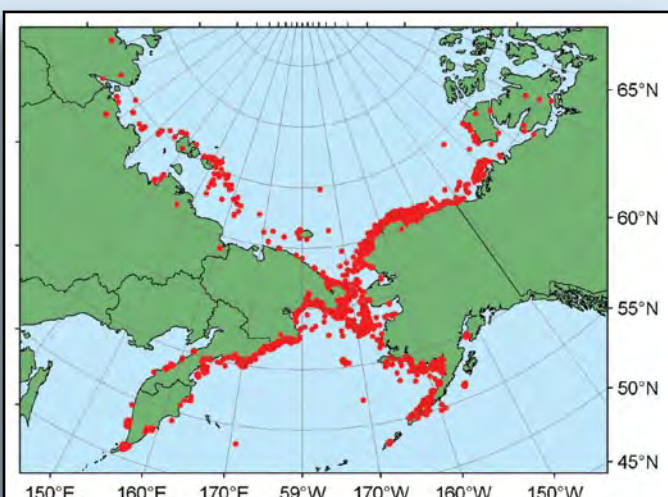
King Eiders (*Somateria spectabilis*) are sea ducks that breed in the Arctic and spend most of the year in cold northern oceans. They dive up to 60 m deep to gather food at the bottom of the sea. Because of their marine lifestyle it has been very challenging to track



Male King Eider with implanted satellite transmitter.

their annual migrations. Since 2002 my colleagues and I have equipped 150 King Eiders in northern Alaska with satellite transmitters and we have discovered interesting aspects of their migrations and movements at sea.

Most adult King Eiders migrate from breeding grounds in Alaska to the Chukotka Peninsula, the easternmost part of Siberia, to molt their flight feathers. In late summer and early fall King Eiders use the abundant food resources around the peninsula to forage while growing new feathers. Some birds stay around Chukotka throughout the winter, despite darkness, freezing temperatures, and sea ice covering most of the ocean. Some King Eiders migrate south along the Russian coast to winter along the Kamchatka Peninsula, and others migrate southeast to winter in Bristol Bay, Alaska. During the long winter in the Bering Sea some birds remain stationary at a single location, whereas other birds fly long distances back and forth between different sites. Individual ducks show individual behavior patterns but we still understand very little about the causes for this variation.



Locations of satellite tracked King Eiders caught between 2002-2007 on breeding grounds in northern Alaska.

King Eiders form pair bonds during the winter and migrate in pairs during spring to return to breeding grounds. While females return to the same breeding site year after year, males follow the female they acquired during the winter to the breeding site of her choice. Because birds from a vast geographic breeding region congregate at winter sites, males can travel halfway around the globe in a single year! Some of the males that we captured in Alaska in one spring migrated to central Siberia in the following spring – 5000 km west of where they had been the year before! Other males migrated to the central Canadian Arctic – 3000 km east of where they were the previous year. King Eiders from half their global breeding range, from 110°E to 110°W, meet at various places in the Bering Sea in winter. The wintering, molting, and staging areas in the Bering and Chukchi Seas are therefore important for a large proportion of the world population of King Eiders.

The eastern Chukchi Sea is especially important during spring migration. The area between Point Barrow and Point Thompson along the Alaskan coast is used by every single King Eider migrating to breeding grounds in western North America. Even more surprising, some King Eiders migrating to Siberia fly a detour of several hundred kilometers to forage in the eastern Chukchi Sea during spring migration. From the results of our satellite tracked birds we estimate that more than half a million eiders congregate in the eastern Chukchi Sea in May each year. The eider staging area is very close to areas currently explored for offshore oil development, and an accidental oil spill in this region could have catastrophic consequences for eiders.



King Eider pair on breeding grounds in Alaska.

Because it is expensive to track birds with satellite transmitters we have developed a new technique that allows us to determine where King Eiders that we observe on breeding grounds spent the previous winter. King Eiders grow head feathers in winter, and by plucking a head feather from birds captured on breeding grounds we can now assign these birds to a region in the Bering Sea where they grew that feather using a technique called stable isotope analysis. We initially collected feathers from birds equipped with satellite transmitters, and found that feathers from birds wintering in different regions in the Bering Sea had a different isotopic composition. This technique can now be applied to a large number of birds at a relatively low cost.

More information about this project, including maps and locations of birds currently flying around with an active transmitter, can be found at: <http://mercury.bio.uaf.edu/kingeider>